

## INSECT FOOD HABIT RATIOS OF NORTH CAROLINA, AND MOUNT DESERT ISLAND, MAINE

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The recent appearance of Dr. William Procter's "Biological Survey of the Mount Desert Region, Part VI, The Insect Fauna," and of Dr. C. S. Brimley's "The Insects of North Carolina," has revived my interest in insect food habit types, and because of the large numbers of species recorded from these two regions, I have taken the liberty of classifying them in accordance with their family food habits in order to arrive at the ratios between the food habit types, and for the purpose of comparing them with ratios found in other areas.

At the outset, I may as well admit the difficulty of classifying families of insects in accordance with the food habits of their members. The feeding habits of many species are still unrecorded. In some families the larvæ and adults have different types of food habits. Some so-called saprophagous insects may not be saprophagous at all, but may feed upon micro-organisms found upon decaying and fermenting organic matter. In view of such difficulties it was necessary, in using the family as a unit, to classify some families in accordance with the predominating feeding habits of their members.

The terms saprophagous, phytophagous, etc., are used in their broadest sense and with the understanding, for example, that the saprophagous group includes coprophagous, sarcophagous, mycetophagous, zoö necrophagous, etc., insects and with the awareness that phytophagous insects feeding upon special parts of living higher plants present special conditions in nutrition. Uvarov believes that a classification of insects on their food habits should be delayed until such habits are better known and I agree with this principle. Nevertheless, I see no objection to generalizations based upon such information as exists.

In arranging the families of insects of North Carolina, and Mount Desert Island, into food habit groups, I omitted the Ano-

plura, Mallophaga, and Siphonaptera because of their non-relation to vegetation. A few other species were omitted also because of the difficulty of placing them in an approximately correct group. However, these omissions are of little importance considering the large number of species involved. It is realized also that lists of the insects of certain regions may of necessity be incomplete in certain parts, due to the absence of diligent collecting in some families, and for other reasons. In spite of such imperfections, a consideration of most of the recorded species shows the following food habit type groupings.

	No. Species	Phyto- phagous Per cent	Sapro- phagous Per cent	Harpacto- phagous Per cent	Para- sitic Per cent	Pollen Feeders, Etc., Per cent
North Carolina	9,249	46	17	22	11	4
Mount Desert Is., Me. ....	5,177	52	17	14	15	2

This table shows the distribution ratios of food habit types present in two large areas, each area embracing different types of vegetation. These ratios are expressed as percentages of the total numbers of species listed in the left hand column, regardless of the numerical abundance of individual species. As various species maintain themselves in certain numerical ratios with respect to factors or combinations of factors tending to reduce their numbers, and as these relationships are usually normal, such numerical ratios have been considered as constant.

The food habit ratios for the insects of North Carolina and Mount Desert Island do not differ widely from those of other large areas. This is shown in the next table, where three additional areas are considered.

In the five areas listed above, each embracing different types of vegetation, the distribution ratios of the types of food habits do not differ widely and suggest a fluctuating relationship within comparatively narrow limits. Although future additions to the numbers of species or more complete information about the food habits of many species would change the ratios somewhat, this would not affect what appears to be a "fixed" relationship, or balance.

In previous papers on the ratios of insect food habits, it was

	No. Species	Phyto- phagous Per cent	Sapro- phagous Per cent	Harpacto- phagous Per cent	Para- sitic Per cent	Pollen Feeders, Etc. Per cent
Western Arctic						
Coast, N. A.	400	47	27	14	10	2
New Jersey.....	10,500	49	19	16	12	4
Connecticut .....	6,781	52	19	16	10	3
North Carolina	9,249	46	17	22	11	4
Mount Desert						
Is., Me. ....	5,177	52	17	14	15	2
Total .....	32,107	49	18	17	12	4

brought out that in relatively small areas, each with a uniform type of vegetation, the ratios between the types of food habits, based on the species present, vary in accordance with the type of vegetation if the numerical ratios between the species and the factors tending to reduce their numbers are considered as constant.

When large areas, each embodying different types of vegetation, are considered, the ratios between the various types of food habits, based on the species present, vary but little when the numerical ratios between the species and the factors tending to reduce their numbers are considered as constant. This idea was advanced in previous papers and the additional evidence of the food habit ratios of the insects of North Carolina and of Mount Desert Island seems to bear this out.

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